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U.S. Department
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APHIS-PPQ

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Pest

Combinations

Order: Family

Economic
Importance

Hosts

PESTS NOT KNOWN TO OCCUR IN THE UNITED STATES OR OF LIMITED
DISTRIBUTION NO. 81: EUROPEAN SPRUCE BEETLE

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EUROPEAN SPRUCE BEETLE
Dendroctonus micans (Kugelann)

Bostrichus micans Kugelann, 1794
Dendroctonus micans Erichson, 1836
Hylesinus micans Ratzeburg, 1839
H. micans Geitel, 1862

Coleoptera: Scolytidae

D. micans is a major pest of spruce throughout its range from eastern Siberia and Japan to the most westerly points of Europe (Evans 1985). After a long period of unnoticed existence, this species reached outbreak levels in several countries about 1947-50 (Bejer-Petersen 1976). In western Siberia, up to 60 adults can penetrate under the bark through a single opening (with one pitch tube) and during intense infestation, up to 300 adults can be found under the bark of a single small tree. These beetles eat the inner bark (phloem) around the entire trunk up to a height of 120 cm (Kolomiets and Bogdanova 1978).

Three factors account for its destructiveness. (1) Aggression: Adults can attack trees singly and successfully overcome the resin flow of spruce without the need for mass aggregation as other bark beetles do. They can infest stressed or apparently healthy trees. (2) Reproduction: Females are very fertile. There is a sex ratio of up to 10 females to 1 male in the brood host and a high frequency of mating before adult emergence. (3) Colonization: Although it flies infrequently, D. micans is nevertheless successful in colonizing new forests. In combination, these attributes imply that once introduced into a forest stand, D. micans will reproduce effectively and infest trees to a damaging degree (Evans 1985).

Picea abies (Norway spruce), and Picea sitchensis (Sitka spruce), are important hosts in western Europe. Other hosts recorded by Brown and Bevan (1966) except for four species include: Abies alba (silver fir), Larix decidua (European

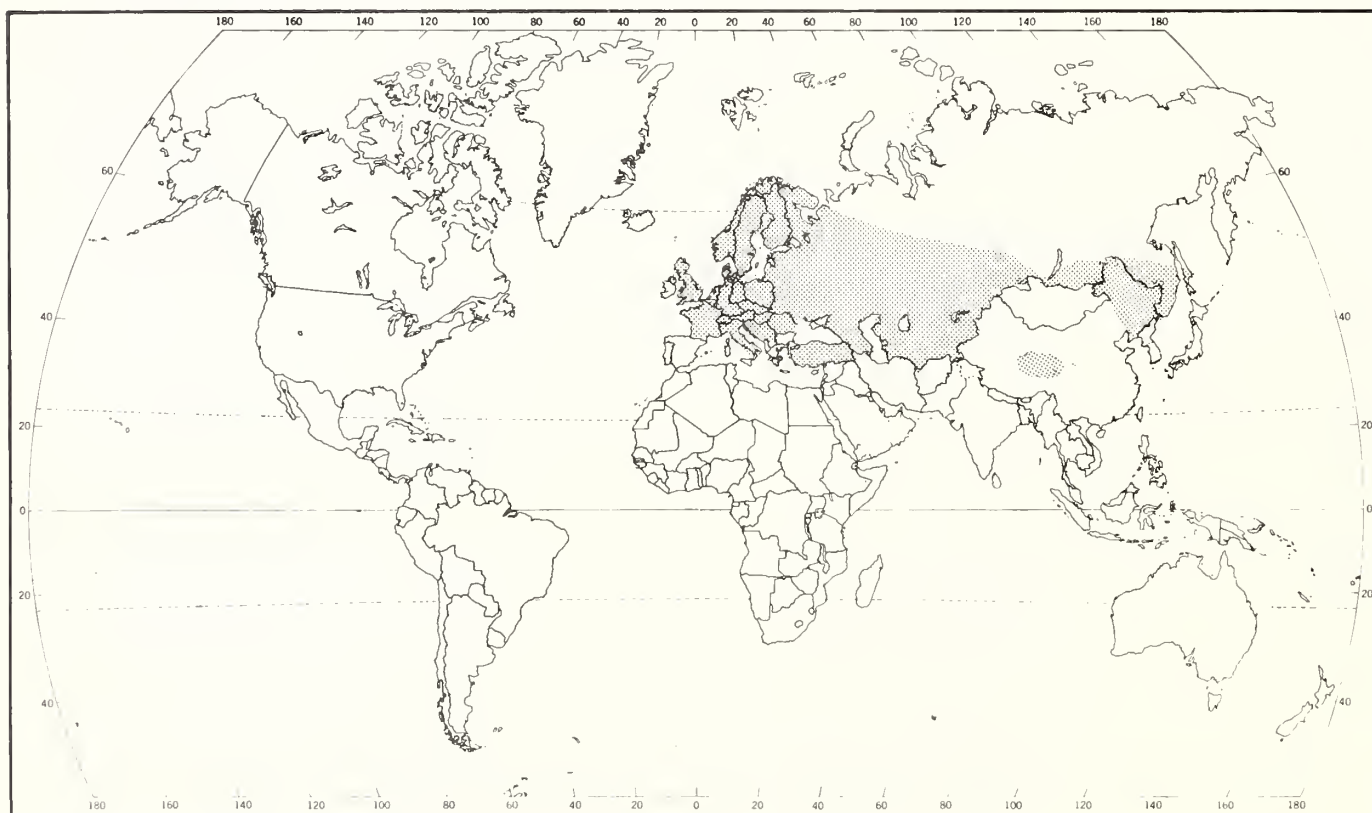
Technical Information Systems Staff, PPQ, APHIS, USDA, Federal Building Room 611, Hyattsville, MD 20782

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larch), Picea asperata (Yin 1984), Picea glauca (white spruce), Picea jezaensis, Picea koyamai (Yin 1984), Picea mariana (black spruce), Picea obovata (Kolomiets and Bogdanova 1978), Picea omorika, Picea orientalis, Picea pungens, Pinus contorta, (lodgepole pine), Pinus mugo (Swiss mountain pine), Pinus nigra (Austrian pine), Pinus sibirica (Kolomiets and Bogdanova 1978), and Pinus sylvestris (Scotch pine).

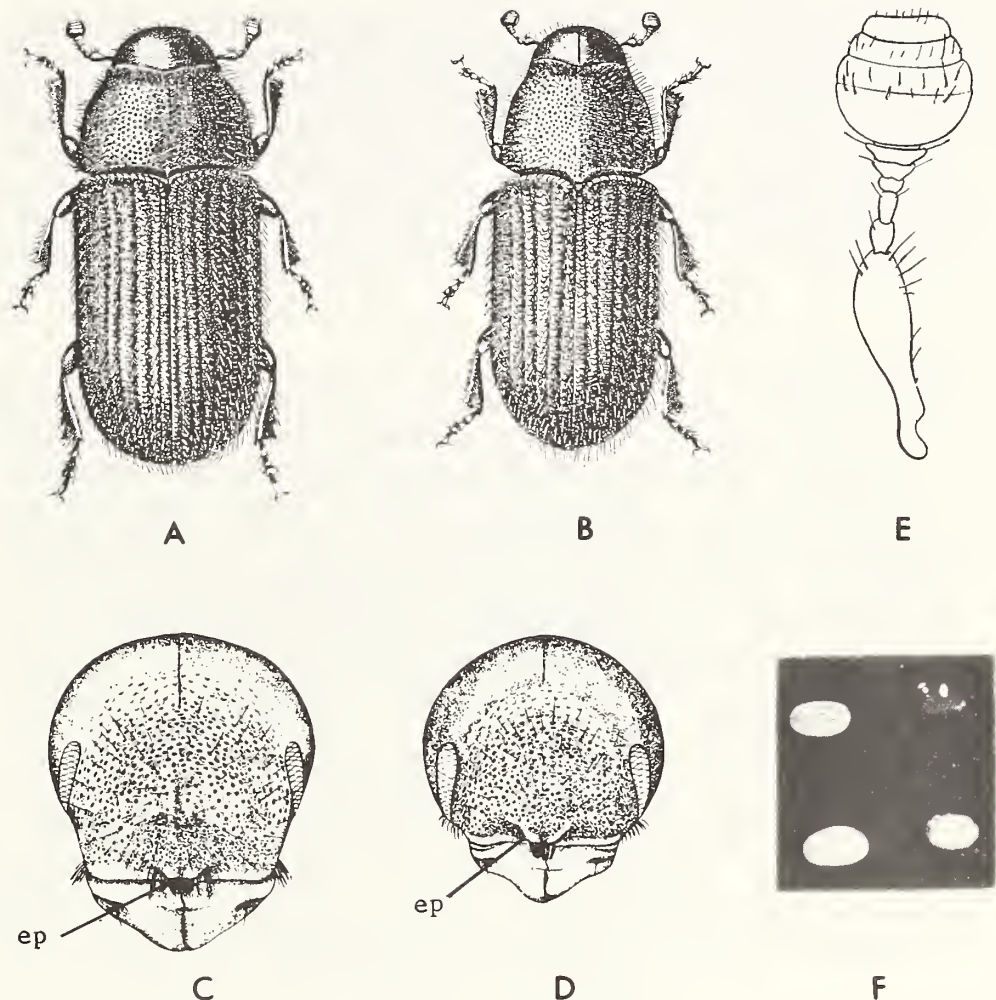
General
Distribution

Unless cited otherwise, the Commonwealth Institute of Entomology (1983) listed the following distribution: ASIA - China (Heilongjiang, Liaoning, Qinghai, Sichuan) (Yin 1984), Turkey; EUROPE - Austria, Belgium, Czechoslovakia, Denmark, Finland, France, East Germany, Hungary, Italy, Luxembourg, Netherlands, Norway, Poland, Romania, Sweden, Switzerland, United Kingdom (Bevan and King 1983), West Germany, and Yugoslavia; and SOVIET UNION - Bryansk, Estonia, Georgia, Kola Peninsula, Moscow, Sakhalin Island (south), Siberia (Altai and west), Transbaikalia, and Ukraine (Carpathians).



Dendroctonus micans distribution map (Prepared by Technical Information Systems Staff, PPQ, APHIS, USDA).

(Fig. 1)



Dendroctonus adults, dorsal view. A. D. micans. B. D. punctatus. Vertical lines represent actual size. C-D. Adult head, front view (ep = epistomal process). C. D. micans. D. D. punctatus. E. D. micans adult antenna. F. Dendroctonus brevicornis eggs, an example of eggs of this genus (A-B from Hopkins 1909a; C-D from Wood 1963; E from Balachowsky 1949; F from Miller and Keen 1960).

Characters

ADULTS (Fig. 1A) - Length about 6.0-8.0 mm from apex of pronotum to apex of elytra, 2.33 times width (Wood 1963). Body dark brown when fully pigmented. Front of head (Fig. 1C) convex; sparsely covered with fine, inconspicuous setae; deeply, coarsely punctate, without tubercles but with a few fine granules in females. Epistomal process (Fig. 1C) flat, anterior margin with dense brush of yellowish setae. Antennae (Fig. 1E) elbowed, funicle of 5 articles, club flattened.

Pronotum slightly wider than long, weakly convex at sides, abruptly narrowed behind anterior margin; surface smooth, shining, punctures coarse, deep; setae moderately dense, fine and short medially, long and coarse laterally. Elytra 2.5 times as long as pronotum; sides subparallel on basal two-thirds, apex broadly rounded; basal margin bordered with row of raised crenulations; striae weakly impressed, with large, deep punctures. Declivity steep, convex, interstrial intervals bearing granules, which are minute in males, larger in females. Elytra setae long, abundant, longest on declivity.

ADULT COMPARISON - This species can be distinguished from all North and Central American species of Dendroctonus through use of the key by Wood (1982). It closely resembles the North American D. punctatus LeConte, Allegheny spruce beetle (Figs. 1B, 1D), from which it can be separated, according to Wood (1963), by the larger size and stouter form, flat [versus concave] epistomal process, smaller striae punctures, somewhat larger elytral granulations, and by the distribution. D. punctatus ranges from Alaska, south to Montana and east to New York and West Virginia. Its hosts are Picea glauca, P. rubens, and P. sitchensis (Wood 1982, pers. comm.).

EGGS - We have not located a description and figure for eggs of D. micans, but they may be presumed to agree with the general description of scolytid eggs by Wood (1982) as "smooth, oval, white, translucent, delicate objects varying in size from one group to another." The egg of D. frontalis Zimmermann, southern pine beetle, was described by Payne (1981) as "slightly oblong to oval with rounded ends...opaque, pearly white, measuring about 1.5 mm long by 1 mm wide." Eggs of D. brevicornis LeConte, western pine beetle, are reproduced in Fig. 1F.

LARVAE - Mature length 6.6-7.9 mm. Head capsule width 1.4-.5 mm (Thomas 1965). Body C-shaped, legless, white, thickest through thorax, sparsely covered with stout, dark setae. Head unretreated, subcircular in outline, convex dorsally, uniformly dark amber except for darker mandibles, with setae as in Fig. 2A. Frontal area (Fig. 2B) broader than long, bearing 5 pairs of setae, anterior half with distinct transverse elevation. Clypeus and labrum as in Fig. 2B. Epipharynx with dark, heavy labral rods and paired setae (Fig. 2C). Mandible with 3 teeth (Fig. 2D). Antenna (Fig. 2E) consists of a membranous area surrounding central conelike process and few tiny sensory papillae. Labium (Fig. 2F) with 2-segmented palpi and trident-shaped premental sclerite. Prothorax with pair of tergal plates and a sternal plate, all lightly pigmented. Abdominal segments 1-7 with 3 dorsal folds. Tergum of 9th abdominal segment with small pigmented sclerite (Fig. 2G). Each spiracle with amber-colored tubercle close above it (Fig. 3).

markings. Length of vein M between bm-cu and r-m is more than 2 X's length of section between r-m and dm-cu. Cell r2+3 is without a hyaline area basal to r-m. Cell br is mostly hyaline. Female abdominal segment 7 (ovipositor sheath, oviscape) is more than 5 mm long. Aculeus (ovipositor) is over 5 mm long, at least as long as segment 7 (tip almost always projecting). Aculeus tip is slender, nonserrate, and in lateral view with 2 sets of steplike ridges (see arrows, Fig. 4). Male aedeagus is more than 6.0 mm long.

LARVAE (Fig. 6) - Full-grown length 16-16.3 mm, maximum width 2.7 mm. Body whitish yellow, cylindrical, tapered anteriorly, truncate posteriorly. Composed of 12 segments: 1 small cephalic, 3 thoracic, and 8 abdominal segments. Abdominal segments 3-8 about uniform in girth. Each abdominal segment on ventral surface at anterior third, transversely callous. Cephalic segment with 3 pairs of papillae (Fig. 7): antennae tri-articulate with apical article small, conical, glabrous, devoid of pores or sensory organs; maxillary palps; preoral papillae barely perceptible. Mouth hooks robust, cephalopharyngeal skeleton heavily sclerotized (Fig. 8). Anterior spiracles (Fig. 9) chestnut yellow, with 34 tubules in 2 sinuous, irregular rows. External thoracic spiracle chamber relatively spacious; in balsam preparation, two scars noted, one external and other internal; internal base smaller than external base and situated at center of clearer, circular zone, where internal tracheae terminates. Posterior spiracle (Fig. 10) with hairs relatively short, in 4 groups as in other Anastrepha; rimae about 4 X's as long as wide. Anal lobes (Fig. 11) entire (Fischer 1932).

PUPAE - Color light chestnut; oval, cylindrical. Length 9.3 mm, maximum width 3.5 mm. Girth greatest at abdominal segments 2-4; thoracic segments dorsoventrally slightly flattened (Fischer 1932).

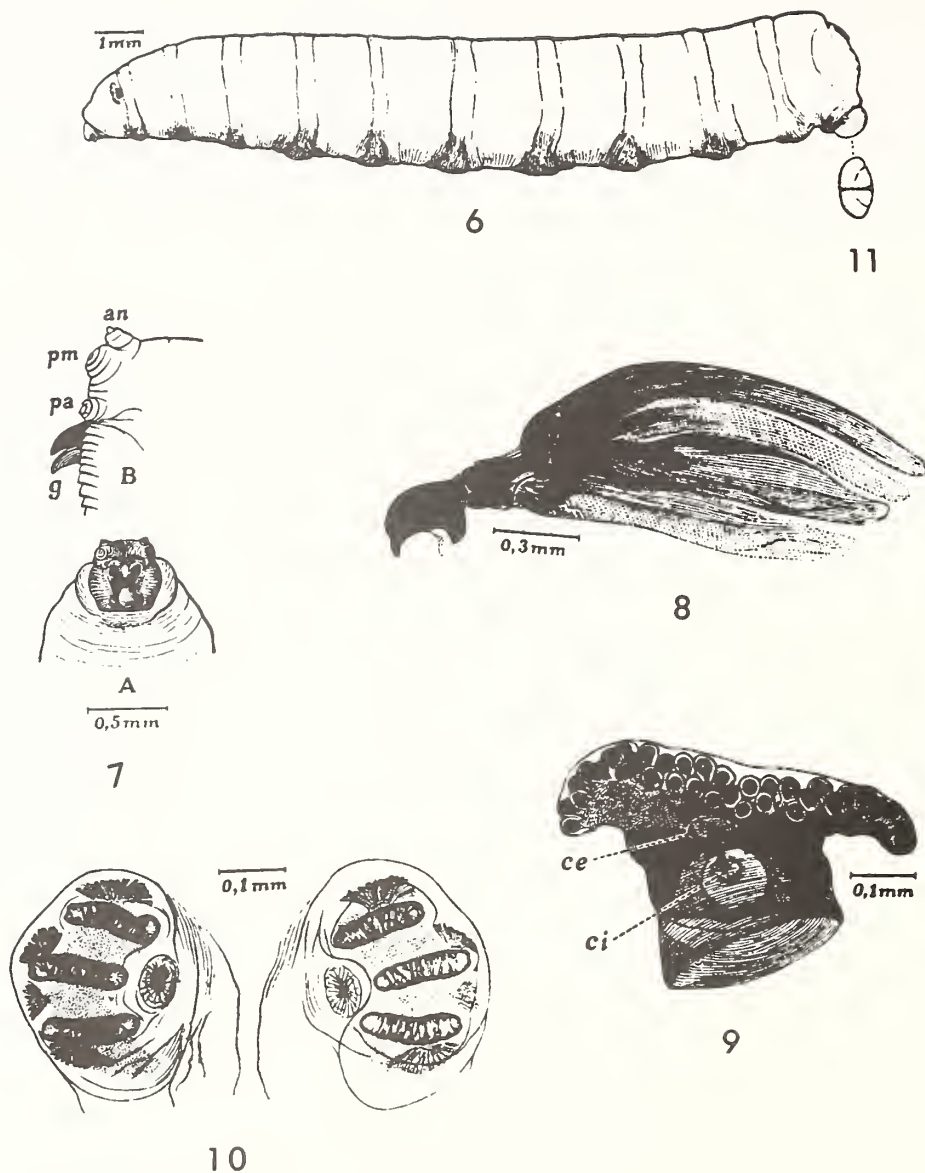
Characteristic
Damage

On squash, the outer skin remains firm over a hollow inside tunneled by larvae. Oviposition punctures on squash appear as slightly transparent circles, about 1.0 mm in diameter, with a black center (J. Fowler, pers. comm.).

Detection
Notes

Movement of infested host fruit could introduce A. grandis into new areas. Various hosts such as watermelon, squash, and pumpkin are prohibited entry into the United States from all

(Figs. 6-11)



Anastrepha grandis larvae. 6. Full grown, lateral view. 7. Head: A. Anterior view. B. Lateral, enlarged view (an, antenna; pm, maxillary palp; pa, g, mouth hooks). 8. Mouth hooks and cephalopharyngeal skeleton, lateral view. 9. Anterior spiracle (ce, external scar; ci, internal scar), dorsal view. 10. Posterior spiracles, posterior view. 11. Anal lobes, ventral view (From Fischer 1932).

countries where this pest is known to occur under Title 7, Part 319.56 of the Code of Federal Regulations. Cucumber and melon are either prohibited or strictly regulated under the same regulations.

Since 1971, larvae identified as Anastrepha sp. have been intercepted from Cucurbita sp. fruit, once from Brazil and once from Peru.

This species may be detected in the following ways.

1. Locate early signs of infestation by examining stem or flower petal attachment sites on fruit for damage. A finger may readily press through the site in infested fruit.
2. Check fruit detached from or still on the vine. Oviposition punctures may be visible. Look for exitholes and larval tunnels in the pulp in fruit on the ground and for larvae in the pulp in fruit still on the vine. Infested fruit can appear undamaged externally.

For identification, submit suspect adult specimens, mounted on pins and labeled, or placed in alcohol according to Part M390.510, subpart 5, of the PPQ General Operational Procedures. Preserve larvae and pupae in alcohol.

Biology

Females lay eggs in the fruit. When larvae have reached full size, the fruit drop from the stem, and larvae emerge and enter the soil to pupate (Stone 1942). The pupal stage lasts 20-26 days (da Costa Lima 1926). Larvae pupating in early May emerge as adults in early June (Fischer 1932). University of São Paulo, Brazil, researchers have observed oviposition and life cycle completion in melons (yellow-honeydew) in the laboratory and in fallow fields where this species occurred (J. Fowler, pers. comm.). No other information on biology is available.

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